

TECHNICAL REVIEW DOCUMENT
For
MODIFICATION TO OPERATING PERMIT 95OPMF040

Questar Gas Management Company – East Hiawatha Compressor Station
Moffat County
Source ID 0810076

Prepared by Jacqueline Joyce
October & November 2005

I. Purpose:

This document establishes the decisions made regarding the requested modifications to the Operating Permit for the East Hiawatha Compressor Station. This document provides information describing the type of modification and the changes made to the permit as requested by the source and the changes made due to the Division's analysis. This document is designed for reference during review of the proposed permit by EPA and for future reference by the Division to aid in any additional permit modifications at this facility. The conclusions made in this report are based on the information provided in the original request for modification submitted to the Division on September 12 and 21, 2005 various e-mail correspondence and telephone conversations with the source. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

II. Description of Permit Modification Request/Modification Type

The renewal operating permit for the East Hiawatha Compressor Station was issued on August 1, 2004. The source submitted a request on September 12, 2005 to get a construction permit for a new engine at the facility. The new engine is intended to replace one of the existing engines, which recently broke down. The new engine is not necessarily intended to permanently replace the existing engine, but will remain until Question determines their future compression needs.

Colorado Regulation No. 3, Part C, Section X.A identifies those modifications that can be processed under the minor permit modification procedures. Specifically, minor permit modifications "are not otherwise required by the Division to be processed as a

significant modification” (Colorado Regulation No. 3, Part C, Section X.A.6). The Division requires that “any change that causes a significant increase in emissions” be processed as a significant modification (Colorado Regulation No. 3, Part C, Section I.B.36.h.(i)). Since estimated emissions from the new engine were below the PSD significance levels, the Division suggested that Questar process the replacement engine permit as a minor modification to the Operating permit. On September 21, 2005, Questar submitted via facsimile a request to incorporate the replacement engine into the Operating Permit using the minor modification procedures in Colorado Regulation No. 3, Part C, Section X. Requested emissions for the replacement engine are 7.4 tons/yr of NO_x, 4.4 tons/yr of CO and 4.4 tons/yr of VOC.

Note that emissions from the engine are as follows:

	Uncontrolled Emissions (tons/yr)			Controlled/Permitted Emissions (tons/yr)		
	NO _x	CO	VOC	NO _x	CO	VOC
Ajax, 2802LE 384 hp Engine	7.4	4.4	4.4	7.4	4.4	4.4

The change in potential to emit with this modification is as shown in the table below:

	NO _x	CO	VOC
Add New Engine ¹	7.4	4.4	4.4
Remove S102/P102	85	74.4	0.5
Change in Emissions for Modification	-77.6	-70	3.9

¹Requested emissions and PTE are the same for the engine.

With the removal of the existing engine and the addition of the replacement engine, facility wide emissions are as follows:

Emission Unit	Potential to Emit (tons/yr)			
	NO _x	CO	VOC	HAPS
S101 – Engine	102	89.2	0.64	See Table on Page 7
S103 – Engine	39.4	34.5	0.25	
S301/302 – Engine (Generator)	12.4	10.1	0.08	
P501 - Dehydrator			49.8	
Condensate Tanks			11.7	
P104 – New Engine	7.4	4.4	4.4	
Total	161.2	138.2	66.87	17.9

The potential to emit of the highest single HAP (toluene) is 6.74 tons/yr. Potential HAP emissions from the dehydrator are based on the APEN submitted on April 24, 2002,

source indicates these emissions represent potential to emit. A more detailed summary of HAP emissions is included on page 7 of this document.

III. Modeling

There is no increase in NO_x or CO emissions with this modification and although there is a 3.9 tons/yr increase in VOC emissions, modeling is not conducted for VOC emissions.

IV. Discussion of Modifications Made

Source Requested Modifications

The Division addressed the source's requested modifications as follows:

New Engine

Unit P104, Ajax, Model No. 2802LE, Serial No. unavailable, 4-Cycle Lean Burn, Natural Gas –Fired Internal Combustion Engine. This engine is rated at 384 hp and 2.675 mmBtu/hr.

Applicable Requirements – CIG has requested that the Division approve the construction and operation of this engine. Since the source has requested that this engine be processed as a combined construction/operating permit using the minor modification procedures in Reg 3, Part C, Section X, no construction permit will be issued and all applicable requirements will be incorporated directly into the operating permit with this modification. The applicable requirements for this unit are as follows:

- Opacity of emissions shall not exceed 20% (Reg 1, Section II.A.1)

Note that no condition is included for the Reg 1 30% opacity standard, which is applicable during certain operating activities. The specific activities under which the 30% opacity standard applies are: building a new fire, cleaning of fire boxes, soot blowing, startup, any process modification, or adjustment or occasional cleaning of control equipment. Based on engineering judgment the Division considers that building a new fire, cleaning of fire boxes and soot-blowing does not apply to the operation of internal combustion engines. In addition, this engine does not have a control device, so adjustment or occasional cleaning of control devices do not apply to this engine. Process modifications and startup may apply to engines, however, based on engineering judgment, the Division believes that such activities would be unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement has not been included in the operating permit.

- Natural Gas consumption shall not exceed 21.9 mmscf/yr (as requested by APEN submitted September 14, 2005).

- Emissions of air pollutants shall not exceed the following limitations (as requested by APEN submitted September 15, 2005):
 - o NO_x 7.4 tons/yr
 - o CO 4.4 tons/yr
 - o VOC 4.4 tons/yr

Note that since this engine is a true minor source, the Division does not require that monthly emission and fuel consumption limits be imposed on this source for the first year of operation as this requirement only applies for major or synthetic minor sources.

- Construction of this source must commence within 18 months of initial approval permit issuance date or within 18 months of date on which such construction or activity was scheduled to commence as stated in the application (Reg 3, Part B, Section III.F.4.a.(i) thru (ii)).
- Within 180 days after commencement of operation, compliance with the conditions contained on this permit shall be demonstrated to the Division (Reg 3, Part B, Section III.G.2).
- The permittee shall notify the Division, in writing, thirty (30) days prior to startup (Reg 3, Part B, Section III.G.1).
- Since this engine will be replacing an existing engine, the permit will include a requirement specifying that prior to commencing operation of the new engine, the existing engine shall be removed from the site and/or rendered inoperable and a letter sent requesting that the APEN be cancelled.

Compliance Assurance Monitoring Requirements

Although this engine is equipped with low NO_x design combustion chambers, this is not considered a control device as passive control measures that act to prevent pollutants from forming are not considered control devices under the provisions of 40 CFR Part 64. Therefore, the Compliance Assurance Monitoring (CAM) requirements (40 CFR Part 64, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV) do not apply to this engine.

MACT Requirements

The facility is a minor source for HAPS; therefore no MACT requirements apply to this engine.

Emission Factors – The source used manufacturer's emission factors to estimate emissions for this engine and those emission factors are in units of g/hp-hr. The annual emission limits were based on maximum horsepower and 8760 hrs/yr of operation. However, for determining annual emissions the Division converts g/hp-hr emission

factors to fuel based emission factors, due to the uncertainties in measuring the horsepower. Therefore, the g/hp-hr emission factors were converted to lb/mmBtu, based on the following equation and the values in the table below:

$$\text{Lb/mmBtu} = \frac{\text{g/hp-hr} \times 10^6 \text{ Btu/mmBtu}}{\text{Heat rate (Btu/hp-hr)} \times 453.6 \text{ g/lb}}$$

Pollutant	Emission Factor (g/hp-hr)	Engine Heat Rate (Btu/hp-hr)	Converted Emission Factor (lb/mmBtu)
NO _x	2	6,966	0.63
CO	1.2		0.38
VOC	1.2		0.38

EPA's Compilation of Emission Factors (AP-42), Section 3.2, Table 3.2-2, dated July 2000 identifies emission factors for 4-cycle low NO_x engines, as follows: NO_x – 4.08 lbs/mmBtu (90 – 105% load), CO 0.557 lbs/mmBtu (90-105% load) and VOC – 0.118 lbs/mmBtu. The source's proposed emission factors for CO and NO_x are less conservative than AP-42.

Monitoring Plan – The monitoring requirements for this engine are based on guidance developed by the Division for Internal Combustion Engines as shown on the attached Grid titled "Compliance/Scenario Summary - Gas Fired IC Engines" and are included in Section II.5 of the permit. As indicated by the grid, the source will be required to monitor and record fuel consumption and calculate emissions monthly. In addition, portable monitoring shall be required on a quarterly basis. Since the emission factors for this engine have been converted to units of lbs/mmBtu, semi-annual sampling and analysis of the natural gas burned shall be required to determine the heat content of the gas. Finally, the Division presumes the engine is in compliance with the opacity requirements, in the absence of credible evidence to the contrary, whenever natural gas is used as fuel.

Other Modifications

In addition to the requested modifications made by the source, the Division used this opportunity to include changes to make the permit more consistent with recently issued permits, include comments made by EPA on other Operating Permits, as well as correct errors or omissions identified during inspections and/or discrepancies identified during review of this modification.

The Division has made the following revisions, based on recent internal permit processing decisions and EPA comments on other permits, to the East Hiawatha Operating Permit with the source's requested modifications.

General

- The Reg 3 citations were revised throughout the permit, as necessary, based on the recent revisions made to Reg 3.

Section II.4 –Condensate Tanks

- Added a note to Condition 4.1 indicating that the monthly E & P Tanks runs would report annual emissions regardless of the number of days of annual operation that is input to the model and that therefore, monthly emissions would have to be determined by multiplying the annual emissions determined from each monthly E & P Tanks run by the number of days in the month divided by the number of days in the year.
- Revised Condition 4.2.3 to require that the source sample the low pressure oil annually for the compositional E & P Tanks input requirement. The permit previously allowed the source to use either the high pressure oil, low pressure oil or low pressure separator gas as the E & P Tanks compositional input requirement.

Section III – Permit Shield

- Corrected the citation. Removed Condition Reg 3, Part C, Section V.C.1.b and C.R.S. § 25-7-111(2)(I) since they don't address the permit shield.

Appendices

- Revised Appendices B and C to latest version and added the new engine to the tables.

HAPS per Division Analysis

Unit	HAP Emissions (tons/yr)									total
	acetaldehyde	acrolein	benzene	toluene	ethyl benzene	xylene	formaldehyde	n-hexane	methanol	
P101	6.86E-02	6.46E-02	1.41E-01	4.52E-02		1.02E-02	6.31E-01		7.52E-02	1.04E-00
P103	2.60E-02	2.45E-02	5.44E-02	1.75E-02		3.94E-03	2.44E-01		2.85E-02	3.99E-01
P301/302	7.58E-03	7.14E-03	1.71E-02	5.48E-03		1.24E-03	7.65E-02		8.31E-03	1.23E-01
P104	9.79E-02	7.42E-02	1.93E-02	9.97E-02		5.19E-03	8.53E-01	1.30E-02	2.93E-02	1.19E-00
Dehy			4.32E-00	6.56E-00	3.69E-01	2.75E-00		8.84E-01		1.49E+01
Condensate Tanks			4.00E-02	2.00E-02		3.00E-03		1.97E-01		2.60E-01
Total	2.00E-01	1.70E-01	4.59E-00	6.74E-00	3.69E-01	2.77E-00	1.80E-00	1.09E-00	1.41E-01	1.79E+01

Engine emissions are based on most conservative emission factor (from AP-42 and HAPCalc 2.0) for each pollutant.

Dehy emissions based on APEN submitted on April 24, 2002, source indicates reported emissions are PTE

Condensate Tank emissions based on APEN submitted on April 29, 2003